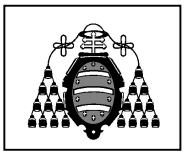

Universidad de Oviedo

Project: ANALYSIS OF COMMERCIAL HAKE SAMPLES

Owner of the results: Center for Public Integrity (Washington, USA), CPI
Reference in the University of Oviedo: FUO-EM-181-11

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Technical analysis: Iván González Pola, laboratory technician.
Sequence analysis and report writing: A. Marta Muñoz Colmenero, MSc in Biology

Responsible researcher: Eva Garcia-Vazquez, Professor of Genetics at the University of Oviedo (Spain).

Address: Department of Functional Biology, University of Oviedo. C/Julian Claveria s/n 33006, Oviedo, Spain. Phone: 985102726; Fax: 385103534; E-mail: egv@uniovi.es

Signed: Eva Garcia-Vazquez

The authors reserve the right of using the sequences for purposes of scientific (academic) presentations and publications. The name of the company and Marcos García Rey as samples provider will be properly acknowledged in all publications, symposia and presentations derived from this project. Coauthorships can be envisaged if the parties agree.

PROJECT RATIONALE

High levels of mislabelling in commercial frozen hake were recently found in Spanish and Greek markets (Garcia-Vazquez et al. 2011), corresponding to samples sold in 2004-2006 and 2010. The substitute species was frequently from Africa and was sold as more expensive American or European species, suggesting deliberate fraud. For that study DNA analyses were carried out for genetic identification (authentication) of the species contained in each commercial product. This procedure is necessary because morphological traits (shape, colour, number of spines) are not conserved in processed fish, both fresh and frozen (fillets, slides, fish fingers). The results were published in a scientific journal of academic scope, Journal of Agriculture and Food Chemistry, were publicised in Spain by the national service of scientific information and news (SINC, FECYT; http://www.agenciasinc.es/) in March 2011. They raised considerable attention by media (TV, radio, newspapers), with public reactions by fishermen and commercial distributors and an open debate about the responsible of the possibly fraudulent practices. A few Internet links with related articles on Spanish media is provided at the end of this Report (References section).

In this context it seemed opportune to expand the study to fresh samples and to check the evolution of hake mislabelling in Spain after the divulgation of the detected level of incorrect species identification in commercial samples.

OBJECTIVES

To determine the type and level of mislabelling, if any, in fresh and frozen commercial hake products sold in Spanish markets in June 2011, six months after the publication of the scientific results and three months after publicising them in Spanish media.

METHODOLOGY

The species was authenticated by DNA analysis.

The samples analyzed corresponded to different commercial products of hake collected from different markets and labels in Madrid (Spain). The number of samples analyzed was 150. The samples were obtained by Marcos García Rey (CPI) between the 9 and the 14 June 2011. Small fragments of tissue were placed into plastic tubes of 100 ml filled with ethanol for tissue conservation. Each tube was labelled with a number and no more information was allowed to the researchers at the University of Oviedo (UO) until the genetic analyses were finished. The package containing the samples was sent by mail to the UO laboratory.

The DNA analysis was carried out in the laboratory L-14 (Genetics of Natural Resources) in the 6th floor of the Faculty of Medicine (Department of Functional Biology, UO). For reference, six hake samples of known origin and species were placed as positive controls in each reaction, as well as a negative control containing only water and PCR reaction mixtures, to exclude any possible contamination of vials and materials.

Laboratory analysis

The extraction of DNA was performed employing a protocol based on resin Chelex (Estoup et al., 1996). A fragment of each sample was introduced into an Eppendorf tube containing 500 µl of a solution of 10% Chelex100 with 7.5 µl of proteinase K (20 mg/ml). The tubes were incubated at 55ºC for 1.5 hours. Finally, the samples were kept at 100ºC for 20 minutes for deactivating the proteinase K. The DNA remains diluted in the supernatant, which is employed for further reactions.

The species-specific DNA marker employed was the cytochrome oxidase subunit I gene. Polymerase chain reactions (PCR) for amplifying the marker from DNA samples were performed in a total volume of 40 µl, employing the Barcode fish primers described by Ward et al. (2005). The PCR program was: initial DNA denaturing at 95 ºC for 5 minutes; 35 cycles of: denaturing at 95 ºC for 20 seconds, annealing at 57 ºC for 20 seconds, extension at 72 ºC for 30 seconds; final extension at 72 ºC for 10 minutes. The

products obtained after the PCR, which are many copies of the DNA marker, were purified and sequenced by the company Macrogen Holland using an Automatic sequencer 3730XL under BigDye Terminator cycling conditions.

All the laboratory process was repeated employing a new aliquot (or bit of tissue) taken from each sample. The results were identical for the two aliquots of each sample and ensure repeatability of the analysis.

Sequence edition

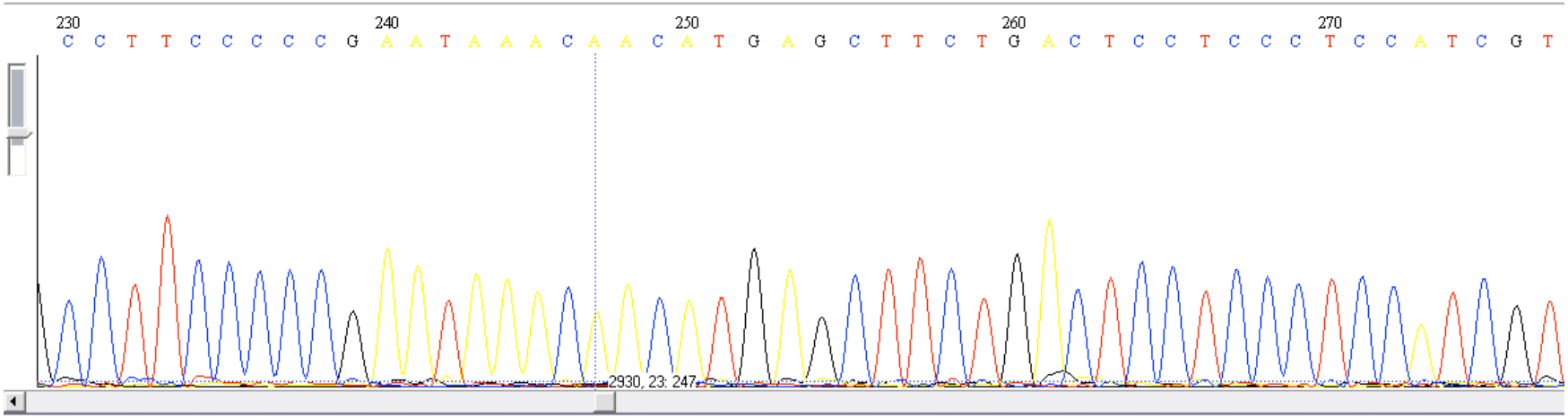
The sequences obtained were visualized onscreen and edited using the BioEdit Sequence Alignment Editor software (Hall, 1999). The sequences are seen as a chromatogram, where each peak represents a nucleotide and the four nucleotides are symbolized each by a different colour (Figure 1)

Assignment of species

To determine the species of a sample, the sequence obtained from the sample was compared with those contained in international databases, including our own reference sequences for all *Merluccius* species which are in the GenBank, employing the program BLAST within NCBI (http://www.ncbi.nlm.nih.gov/). Species assignation was made based on > 99% sequence similarity with GenBank voucher specimens. The percentages given by this tool are: coverage or length of the problem sequence covered by the GenBank reference sequence, and Maximum Identity or percentage of identical nucleotides in the two sequences (problem and GenBank).

Sequence comparison was made independently by two different UO researchers to ensure reliability of the species determination.

Figure 1. Chromatogram visualized with the software BIOEDIT, showing a fragment of *Merluccius merluccius* cytochrome oxydase I gene.



Merluccius merluccius

Temporal sequence of the analysis

The samples arrived to the UO laboratory the 16 June 2011.

The definitive genetic results were completed the 27 June 2011.

The genetic results were written in an excel table, containing the number of each sample and the corresponding species as authenticated from DNA. The table was sent by e-mail to Marcos García Rey the 28 June 2011 (5 PM Spanish time).

At the same time, Marcos García Rey sent to UO (egv@uniovi.es) a Table with full information on each sample: species stated on the label, selling point, commercial label, sampling date and other details (see complete Table in Annex I).

RESULTS

In total 100 frozen and 50 fresh products were sampled and sequenced. From each sample, we obtained a clean sequence of 541 nucleotides (components of the DNA chain). The sequences are given in the Annex II.

The comparison of the real species as identified from DNA and the species stated on the label of the commercial product revealed some discrepancies (Annex III). In total, 8.6 % samples were mislabelled (Table 1).

Table 1: Labelling errors found in the analyzed samples. Species marked in red are very distant from the genus *Merluccius*, that is, they are no true hakes.

Sample code number	Commercial presentation	Species stated in the label	Species from DNA analysis
9	Frozen fillets	*M. capensis / M. paradoxus*	*Pangasianodon hypophthalmus*
20	Frozen belly	*M. merluccius*	*Merluccius paradoxus*
25	Frozen skinless fillets	*M. australis*	*Merluccius paradoxus*
26	Frozen slides	*M. australis*	*Merluccius hubbsi*
61	Frozen medallions	*M. merluccius*	*Coryphaenoides acrolepis*
62	Frozen whole piece	*M. senegalensis*	*Merluccius polli*
63	Frozen pieces	*M. capensis*	*Merluccius merluccius*
65	Fresh whole piece	*M. capensis / M. paradoxus*	*Merluccius merluccius*
83	Fresh whole piece	*M. australis*	*Merluccius merluccius*
87	Fresh pieces	*M. merluccius*	*Merluccius australis*
117	Fresh whole piece	*M. hubbsi*	*Merluccius merluccius*
119	Fresh fillets	*M. australis*	*Merluccius merluccius*
149	Frozen fillets	*M. hubbsi*	*Macruronus magellanicus / novazelandiae*

In three cases the substitute species were not *Merluccius* (true hakes): *Pangasianodon hypophthalmus*, Pangassius, a Vietnamese freshwater catfish, was sold as Cape hake (*Merluccius capensis/paradoxus*). One specimen of *Coryphaenoides acrolepis*, which is a North Pacific grenadier, was sold as European hake (*Merluccius merluccius*). Finally, a South American grenadier *Macruronus magellanicus* was sold as an Argentinean hake *Merluccius hubbsi*. The first case was particularly fraudulent and could cause severe health problems to the unaware consumers because being a very distant species the allergenic properties are different, and consumers allergic to that catfish could suffer serious allergic reaction and even anaphylactic shocks. This problem could also occur in

the case of inadvertent consumption of grenadiers, which are allergenic species (Koyama et al. 2006). In these three cases the mislabeling is surely deliberate, because the mistaken species are morphologically very different and it is not possible to confound them.

Table 2: Mislabelling, by species.

Species	Mislabelling
False *M. merluccius*	3 (23.08 %)
False *M. capensis*	3 (23.08 %)
False *M. australis*	4 (30.77 %)
False *M. hubbsi*	2 (15.38 %)
False *M. senegalensis*	1 (7.69 %)

By species, the most frequently mislabelled was *M. australis* with 4 false individuals (Table 2). One turned out to be *M. paradoxus*, an African species; another was *M. hubbsi*, a South American species from Argentinean waters; and the other two were *M. merluccius*, which is European. *M. australis* is a much appreciated species from deep waters of South America and New Zealand which also inhabits the Antarctic territory. The mislabelling error in the particular case of this species seems to be deliberate, since the substitute species are from different continents (Figure 2).

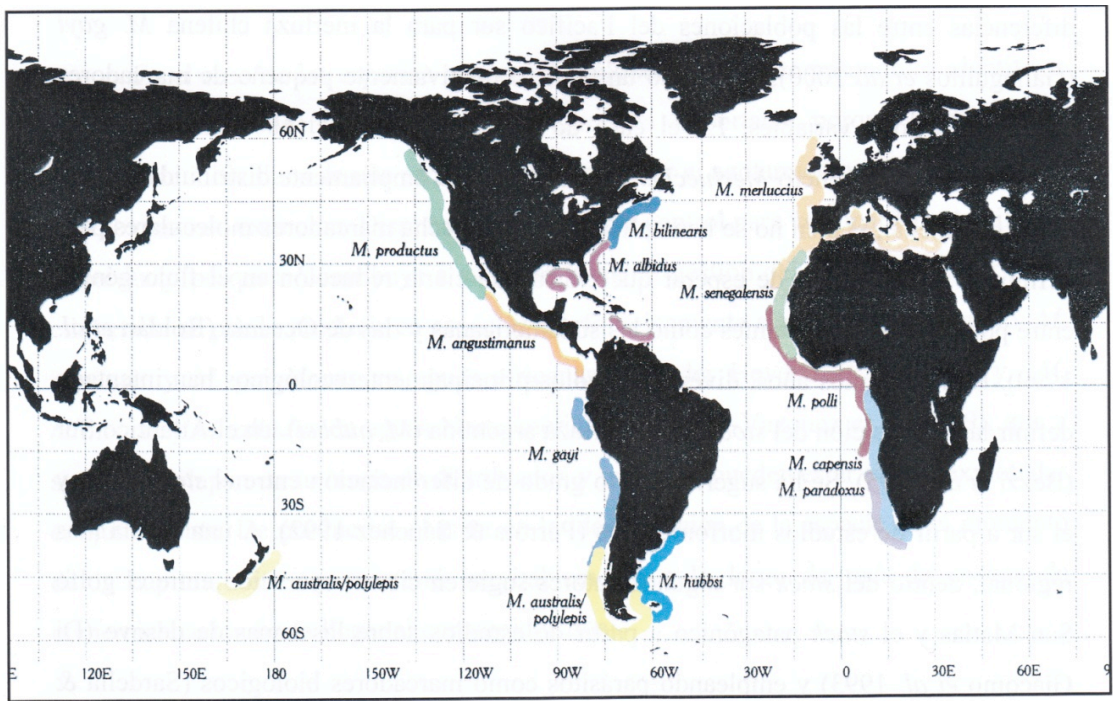


Figure 2: Geographic distribution of 12 species of genus *Merluccius*. Picture obtained from Pitcher and Alheit (1995) and amended by Castillo AGF.

In the case of false *M. merluccius* (three cases), similarly, mislabelling is likely deliberate because European hake uses to be the most expensive species (with some annual oscillations in price) and substitute species are generally cheaper.

For *M. capensis* substitutions, one case was clearly deliberate because it was replaced by Asian catfish (*Pangasianodon hypophthalmus*), the freshwater species commented above. The two cases when it was replaced by *M. merluccius* were probably inadvertent because, as noted above, *M. merluccius* price is generally higher, and the change would result in economic losses. The price of the different true hake species (*Merluccius*) being enormously varied (Annex I) with the exception of the expensive *Merluccius merluccius* and *Merluccius australis*.

For the two false *M. hubbsi*, only one mislabelling case could be considered deliberate: when the substitute species was *Macruronus magellanicus*, a grenadier of much lower value. The other case, where *M. merluccius* was sold as *M. hubbsi*, would result in economic losses. Finally, the false *M. senegalensis* could have been replaced by *M. polli* inadvertently: the two species are from African waters and overlap in their distribution range (Figure 2).

By **type of product**, frozen or fresh, the level of mislabelling was different. Fresh products exhibited more mislabelling (12%, 6/50) than frozen products (7%, 7/100).

By **supermarket or shop**, the mislabelling ranked from 0 (several brands and shops) to 25% (Table 3). Mislabelling was found in five supermarket chains and many small shops or local sellers (they were grouped together in Table 3). The highest level was found in Alcampo (25%), while six supermarket chains did not exhibit mislabelling in the analyzed samples. This result points out the need of analyzing more samples from each label or market, in order to obtain reliable mislabelling rates of statistical significance.

Table 3: Mislabelling, by selling point

Supermarket chain/shop	Mislabelling
Alcampo	4/16 = 25%
El Corte Inglés	1/5 = 20%
Hipercor	2/16 = 12.5%
Small stores and local chains	4/39 = 12.3%
Eroski	1/14 = 7.1%
Carrefour	1/15 = 6.7%
Lidl	0
Supersol	0
Mercadona	0
DIA	0
Simply	0
Ahorramás	0

In the present study it is not possible to perform statistical comparisons among selling points, brands or distributors due to small sample sizes (less than 20 from each shop, brand and distributor), which does not allow significance of common statistical tests.

INTERPRETATION AND COMPARISON WITH OTHER STUDIES

The levels of mislabelling found in this project were varied amongst selling points. Statistical comparisons with previous studies are not possible because, first, the samples were not taken from the same retailers and supermarkets, and second, it is not possible to reveal the sampling sources of the results published by Garcia-Vazquez et al. in 2011 (the name of the shops/supermarkets) because they are protected by professional ethical rules. Notwithstanding it, we can inform (without identifying their names) that two of them were also sampled in the present project. The mislabelling level (% of mislabelled samples) was exactly the same in one case and decreased in other case, which could be considered good news for the consumer or just a matter of chance given relatively small sample sizes from each supermarket.

The main novelty of the present project in comparison with previous studies on commercial Spanish hake is that here we have analyzed also fresh products. The sample size was 50 samples from nine different chains and several local shops, and the analysis

yielded 12% mislabelling, which is very high considering the dispersion of the samples amongst selling points. It was slightly less than double of that found in frozen products. Beyond the particular percentages obtained in this project, that likely underestimate the actual volume of mislabelling (explained below), an important conclusion is that fresh products seem to concentrate species substitution cases. It is worthy exploring this particular market with more samples from each shop/retailer/brand.

Finally, the actual mislabelling rate is likely much higher than the values obtained in this project. This interpretation comes from the type of sampling followed here. In previous studies by the same and other authors it has been published that in the same shop or brand, even in the same package, there are mixtures of species (of course only one corresponds to the species stated in the label). Taking one sample from each lot reduces the chance of finding fraudulent species mixtures. Enlarging the sample size from each shop is recommended for future studies if the aim is to obtain statistically significant results.

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http://www.20minutos.es/noticia/984454/0/

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ANNEX I.

Details of the analyzed samples

Code 1	Code 2	Date	Shop name	Geographic origin	FAO area	Fresh / Frozen	Presentation	Brand	Euro / kilo
1	F1	June 9	Antonio Pérez	Cantabrian Sea	FAO 27	Fresh	Whole piece		17.99
2	F2	June 9	Antonio Pérez	Cantabrian Sea	FAO 27	Fresh	Whole piece		9.99
3	F3	June 9	Hermanos González		FAO 27	Fresh	Whole piece		9.90
4	F4	June 9	Hermanos González		FAO 27	Fresh	Whole piece		24.90
5	C1	June 9	Congelados Dimapes	Chile	FAO 87	Frozen (bulk)	Tail		9.35
6	C2	June 9	Congelados Dimapes	Namibia	FAO 47	Frozen (bulk)	Fillets with skin		6.10
7	F5	June 9	Pescados Manaba	Chile	FAO 87	Fresh	Whole piece		9.90
8	F6	June 9	Pescados Manaba	National	FAO 27	Fresh	Whole piece		6.99
9	C3	June 9	Pescados del Bierzo	South Africa	FAO 47	Frozen (bulk)	Skinless fillets		5.40
10	F7	June 9	Pescados del Bierzo	Ireland	FAO 27	Fresh	Whole piece		6.99
11	F8	June 9	Pescados del Bierzo	Ondarroa (ES)	FAO 27	Fresh	Whole piece		4.49
12	F9	June 9	La Pescadería de San Antón	La Coruña (ES)	FAO 27	Fresh	Whole piece		6.09
13	F10	June 9	La Pescadería de San Antón	San Sebastian (ES)	FAO 27	Fresh	Whole piece		9.40
14	C4	June 9	La Pescadería de San Antón	Namibia	FAO 47	Frozen (bulk)	Loins		6.30
15	F11	June 9	La Ría	Burela (ES)	FAO 27	Fresh	Whole piece		22.80
16	F12	June 9	La Ría	Burela (ES)	FAO 27	Fresh	Whole piece		10.80
17	F13	June 9	Pescados y Mariscos E. Mayo	Galicia (ES)	FAO 27	Fresh	Whole piece		7.90
18	F14	June 9	Pescados y Mariscos E. Mayo	Burela (ES)	FAO 27	Fresh	Tail		12.00
19	F15	June 9	Dufipesca	Burela (ES)	FAO 27	Fresh	Whole piece		6.99
20	C5	June 9	Congelados Raquel y María del Val	Ireland	FAO 27	Frozen (bulk)	Belly	Pescanova	6.90
21	C6	June 9	Congelados Raquel y María del Val	Namibia	FAO 47	Frozen (bulk)	Fillets with skin		6.40
22	F16	June 9	Pescadería Franco e Hijos	La Coruña (ES)	FAO 27	Fresh	Whole piece		6.90
23	F17	June 9	Pescadería B. Encabo	Burela (ES)	FAO 27	Fresh	Whole piece		10.99
24	F18	June 9	Pescados y Mariscos Fiurpesca SL	La Coruña (ES)	FAO 27	Fresh	Whole piece		3.90
25	C7	June 9	Pescados y Congelados Conchi	Chile	FAO 87	Frozen (bulk)	Skinless Fillets	Pescanova	7.99
26	C8	June 9	Pescados y Congelados Conchi	Chile	FAO 87	Frozen (bulk)	Slices	Pescanova	7.00
27	F19	June 9	Pescados y Mariscos Ortega	La Coruña (ES)	FAO 27	Fresh	Whole piece		9.99
28	F20	June 10	Pescadería El Mar	La Coruña (ES)	FAO 27	Fresh	Whole piece		9.98
29	F21	June 10	Pescadería El Mar	Pacific Ocean	FAO 87	Fresh	Whole piece		13.90
30	F22	June 10	Pescados y Mariscos del Puerto	The Sole Bank	FAO 27	Fresh	Whole piece		16.80
31	F23	June 10	Pescadería L. Martínez	Burela (ES)	FAO 27	Fresh	Whole piece		10.80

32	F24	June 10	Pescadería L. Martínez	Cantabrian Sea	FAO 27	Fresh	Whole piece		24.80
33	F25	June 10	Pescados Mariscos Manolo y Julián	The Sole Bank	FAO 27	Fresh	Whole piece		6.99
34	C9	June 10	Manuel Alonso	South Africa	FAO 47	Frozen (bulk)	Slices	Antonio y Ricardo	7.49
35	C10	June 10	Manuel Alonso	South Africa	FAO 47	Frozen (bulk)	Fillets with skin	Rainbow Trawling	5.50
36	C11	June 10	La Sirena	Atlantic, Southeast	FAO 47	Frozen (bulk)	Skinless fillets	La Sirena	7.50
37	C12	June 10	La Sirena	Pacific, Southeast	FAO 87	Frozen (bulk)	Whole piece H&G	La Sirena	6.95
38	C13	June 10	La Sirena	Pacific, Southeast	FAO 87	Frozen (bulk)	Slices	La Sirena	9.99
39	C14	June 10	La Sirena	Atlantic, Southeast	FAO 47	Frozen (bulk)	Loins	La Sirena	8.99
40	F26	June 13	Mercadona	South Africa	FAO 47	Fresh	Whole piece	Caladero	5.99
41	F27	June 13	Mercadona	Atlantic, Southeast	FAO 47	Fresh	Loins	Caladero	9.05
42	F28	June 13	Mercadona	Atlantic, Southeast	FAO 47	Fresh	Slices	Caladero	8.80
43	C15	June 13	Mercadona	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Belly	Mascato	6.88
44	C16	June 13	Mercadona	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Fillets with skin	Mascato	6.05
45	C17	June 13	Mercadona	Altantic, Southeast (Namibia)	FAO 47	Frozen	Whole piece H&G	Mascato	4.44
46	C18	June 13	Mercadona	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Medallions	Mascato	6.08
47	C19	June 13	Mercadona	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Slices	Mascato	5.17
48	C20	June 13	Mercadona	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Skinless fillets	Mascato	6.05
49	C21	June 13	Mercadona	Atlantic, Southeast (Namibia)	FAO 47	Frozen (bulk)	Whole piece H&G	Mascato	4.90
50	C22	June 13	Alcampo	Atlantic, Southwest	FAO 41	Frozen	Skinless fillets	Auchan	5.50
51	C23	June 13	Alcampo	Atlantic, Southeast	FAO 47	Frozen	Loins	Auchan	8.73
52	C24	June 13	Alcampo	Atlantic, Southeast	FAO 47	Frozen	Fillets with skin	Pescanova	8.20
53	C25	June 13	Alcampo	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Auchan	5.55
54	C26	June 13	Alcampo	Atlantic, Southeast	FAO 47	Frozen	Belly	Pescanova	8.1
55	C27	June 13	Alcampo	Atlantic, Southeast	FAO 47	Frozen	Steaks	Auchan	9.23
56	C28	June 13	Alcampo	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Steaks (corazones de filete)	Pescanova	8.96
57	C29	June 13	Alcampo	Atlantic, Southeast	FAO 47	Frozen	Belly	Auchan	7.23
58	C30	June 13	Alcampo	Atlantic, Southeast	FAO 47	Frozen	Slices	Auchan	5.85
59	C31	June 13	Alcampo	Pacific, Southeast	FAO 87	Frozen	Slices	Pescanova	14.98
60	C32	June 13	Alcampo	Atlantic, Southwest	FAO 41	Frozen (bulk)	Skinless fillets	Nakar	5.75
61	C33	June 13	Alcampo	Atlantic, Northeast	FAO 27	Frozen (bulk)	Medallions	Nakar	5.5
62	C34	June 13	Alcampo	Atlantic, Eastern Central	FAO 34	Frozen (bulk)	Whole piece H&G	Nakar	4.50
63	F29	June 13	Alcampo	Altantic, Southeast (Namibia)	FAO 47	Fresh	Slices	Alcampo	24.95
64	F30	June 13	Alcampo	Atlantic, Northeast	FAO 27	Fresh	Orejas (neck?)	Alcampo	11.95
65	F31	June 13	Alcampo	South Africa	FAO 47	Fresh	Whole piece		5.95
66	C35	June 13	DIA	Atlantic, Southeast	FAO 47	Frozen	Whole piece H&G	DIA	3.92
67	C36	June 13	DIA	Atlantic, Southeast	FAO 47	Frozen	Loins	DIA	7.37
68	C37	June 13	DIA	Atlantic, Southeast	FAO 47	Frozen	Belly	DIA	7.75
69	C38	June 13	DIA	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Loins	Pescanova	12.48
70	C39	June 13	DIA	Atlantic, Southeast (Namibia)	FAO 47	Frozen	Fillets with skin	Pescanova	4.97
71	C40	June 13	DIA	Pacific, Southeast	FAO 87	Frozen	Slices	DIA	10.65
72	C41	June 13	DIA	Atlantic, Southwest	FAO 41	Frozen (bulk)	Whole piece H&G	Pereira	4.99

73	C42	June 13	DIA	Atlantic, Southeast (Namibia)	FAO 47	Frozen (bulk)	Slices	Pereira	4.75
74	C43	June 13	DIA	Atlantic, Southeast	FAO 47	Frozen (bulk)	Fillets with skin	Pescapuerta	5.40
75	C44	June 13	Carrefour	Atlantic, Southwest	FAO 41	Frozen	Cheeks (Cocochas)	Delfín Frigoríficos	25.9
76	C45	June 13	Carrefour	Atlantic, Southeast	FAO 47	Frozen	Loins	Pescanova	12.48
77	C46	June 13	Carrefour	Atlantic, Southeast	FAO 47	Frozen	Whole piece H&G	Pescanova	5.25
78	C47	June 13	Carrefour	Atlantic, Southeast	FAO 47	Frozen	Belly	Pescanova	8.13
79	C48	June 13	Carrefour	Atlantic, Southwest	FAO 41	Frozen	Fillets	Carrefour	4.92
80	C49	June 13	Carrefour	Atlantic, Southwest	FAO 41	Frozen	Fillets	Carrefour	5.75
81	C50	June 13	Carrefour	Atlantic, Southeast	FAO 47	Frozen	Medallions	Pescanova	12.48
82	F32	June 13	Carrefour	Pacific, Southeast	FAO 87	Fresh	Fillets		13.90
83	F33	June 13	Carrefour	Pacific, Southeast (Chile)	FAO 87	Fresh	Whole piece		5.50
84	C51	June 13	Carrefour	Atlantic, Southwest	FAO 41	Frozen	Slices	Carrefour	5.75
85	C52	June 13	Carrefour	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Pescanova	8.23
86	C53	June 13	Carrefour	Atlantic, Southeast	FAO 47	Frozen	Steaks (corazones de filete)	Pescanova	9.50
87	F34	June 13	Eroski	Atlantic, Northwest	FAO 21	Fresh	Pieces		10.20
88	F35	June 13	Eroski	Cantabrian Sea	FAO 27	Fresh	Whole piece		5.75
89	C54	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Medallions	Eroski	6.58
90	F36	June 13	Eroski	Cantabrian Sea	FAO 27	Fresh	Fillets		11.95
91	C55	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Slices	Eroski	6.65
92	C56	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Steaks (corazones de filete)	Pescanova	9.98
93	C57	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Loins	Pescanova	12.48
94	C58	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Steaks (centros)	Pescanova	11.98
95	C59	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Fillets	Eroski	3.95
96	C60	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Pescanova	8.48
97	C61	June 13	Eroski	Atlantic, Southwest	FAO 41	Frozen	Fillets	Eroski	4.99
98	C62	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen (bulk)	Whole piece H&G	Pescapuerta	7.95
99	C63	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen (bulk)	Skinless fillets	Pescapuerta	7.67
100	C64	June 13	Eroski	Atlantic, Southeast	FAO 47	Frozen	Steaks (centros)	Eroski	8.48
101	C65	June 13	Carrefour	Atlantic, Southwest	FAO 41	Frozen	Skinless fillets	Carrefour	6.00
102	C66	June 13	Carrefour		FAO 41, 47	Frozen	Slices	Mar de Altura	7.90
103	C67	June 13	Carrefour	Atlantic, Southwest	FAO 41	Frozen	Tails	Mar de Altura	4.93
104	C68	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Steaks (centros)	Pescanova	11.98
105	C69	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Medallions	Pescanova	14.38
106	C70	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Steaks (corazones de filete)	Pescanova	9.98
107	C71	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Steaks (centros)	Hipercor	9.98
108	C72	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Belly	Hipercor	7.45
109	C73	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Loins	Hipercor	10.75
110	C74	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Loins	Pescanova	19.38
111	C75	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Hipercor	8.73
112	C76	June 13	Hipercor	Pacific, Southeast	FAO 87	Frozen	Slices	Pescanova	21
113	C77	June 13	Hipercor	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Pescanova	8.98

114	F37	June 13	Hipercor	Atlantic, Northeast	FAO 27	Fresh	Fillets	Rías Gallegas	16.95
115	F38	June 13	Hipercor	Cantabrian Sea	FAO 27	Fresh	Fillets		49.90
116	F39	June 13	Hipercor	Atlantic, Northeast	FAO 27	Fresh	Whole piece		39.90
117	F40	June 13	Hipercor	Atlantic, Southwest	FAO 41	Fresh	Whole piece		11.90
118	F41	June 13	Hipercor	Atlantic, Eastern Central	FAO 34	Fresh	Whole piece		5.95
119	F42	June 13	Hipercor	Pacific Ocean	FAO 87	Fresh	Fillets		13.80
120	F43	June 14	Supersol	Chile	FAO 87	Fresh	Whole piece		5.99
121	F44	June 14	Supersol	Spain	FAO 27	Fresh	Whole piece H&G		6.90
122	C78	June 14	Supersol	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Pescanova	8.55
123	C79	June 14	Supersol	Atlantic, Southwest	FAO 41	Frozen	Skinless fillets	Supersol	5.80
124	C80	June 14	Supersol	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Pescanova	8.48
125	C81	June 14	Supersol	Atlantic, Southeast	FAO 47	Frozen	Medallions	Pescanova	15.40
126	C82	June 14	Lidl	Atlantic, Southwest	FAO 41	Frozen	Slices	Admiral	4.98
127	F45	June 14	Simply	Chile	FAO 87	Fresh	Whole piece		7.90
128	F46	June 14	Simply	Atlantic, Northeast	FAO 27	Fresh	Whole piece		4.25
129	C83	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Pescanova	8.73
130	C84	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Auchan	7.88
131	C85	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen	Slices	Auchan	12.13
132	C86	June 14	Simply	Atlantic, Southwest	FAO 41	Frozen	Skinless fillets	Simply	6.00
133	C87	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen	Fillets with skin	Simply	5.92
134	C88	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen	Loins	Pescanova	12.48
135	C89	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen	Belly	Pescanova	9.75
136	C90	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen	Medallions	Pescanova	13.10
137	C91	June 14	Simply	Atlantic, Southeast	FAO 47	Frozen (bulk)	Fillets with skin	Simply	4.98
138	F47	June 14	Ahorramás	Atlantic, Northeast	FAO 27	Fresh	Whole piece		5.98
139	F48	June 14	Ahorramás	Atlantic, Northeast	FAO 27	Fresh	Whole piece		4.98
140	F49	June 14	Ahorramás	Atlantic, Northeast	FAO 27	Fresh	Whole piece		4.98
141	C92	June 14	Ahorramás	Atlantic, Southwest	FAO 41	Frozen	Slices	Alipende	6.32
142	C93	June 14	Ahorramás	Atlantic, Southeast	FAO 47	Frozen	Skinless fillets	Alipende	6.58
143	C94	June 14	Ahorramás	Atlantic, Southwest	FAO 41	Frozen	Skinless fillets	Antonio y Ricardo	7.18
144	C95	June 14	Ahorramás	Atlantic, Southeast	FAO 47	Frozen	Medallions	Antonio y Ricardo	7.20
145	C96	June 14	Ahorramás	Atlantic, Southeast	FAO 47	Frozen	Belly	Alipende	7.23
146	C97	June 14	El Corte Inglés	Atlantic, Southeast	FAO 47	Frozen	Loins	El Corte Inglés	11.23
147	C98	June 14	El Corte Inglés	Atlantic, Southeast	FAO 47	Frozen	Steaks (centros)	El Corte Inglés	10.50
148	C99	June 14	El Corte Inglés	Atlantic, Southeast	FAO 47	Frozen	Belly	El Corte Inglés	7.88
149	C100	June 14	El Corte Inglés	Atlantic, Southwest	FAO 41	Frozen	Skinless fillets	Aliada	6.25
150	F50	June 14	El Corte Inglés	Atlantic, Northeast	FAO 27	Fresh	Whole piece		48.90

ANNEX II

DNA sequences of the analyzed samples at the COI gene, presented in the standard format and marking the 5’ and the 3’ ends, for enabling further comparisons and utilization in international databases.

1
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
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2
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
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ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
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3
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4
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5
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6
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TTtGgCCACCAgAAGTCTA 3'

7
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8
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9
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15
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16
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17
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TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
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18
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTATCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
ATTGGCCACCcAgAAGTCTAA 3'

19

5'CGGAACAGCCCTTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCC
TCCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTT
GCAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCA
GGCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCT
GCCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTC
CTGCTATCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATT
CTTTGGCCACCA 3'

20
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCa 3'

21
5'CAACCAGGCGCGCTCCTGGGCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCT
TCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCC
CCCTAATGATTGGGGCCCCCGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTT
CTCCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGG
CTGAACAGTCTATCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCAC
CATCTTCTCACTCCACCTAGCAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTAC
TATTATCAACATAAAACCCCCTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGT
CCTTATTACAGCCGTCCTGCTACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCT
ATTAACTGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCC
TATACCAACACTTGTTCTGATTCTATGGCCACCA 3'

22
5'CAACCAGGCGCACTCCTGGGCGACGATCAAATCcATAACGTGATCGTCACGGCACACGCCT
TCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCC
CCCTAATGATCGGAGCCCCCGACATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTC
CTCCCTCCATCGTTCCTGCTCCTCCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGG
CTGAACGGTCTATCCCCCTCTTGCAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCAC
CATTTTCTCCCTCCACCTAGCAGGCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTAC
CATCATCAACATAAAACCCCCTGCCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGT
CCTTATTACAGCCGTACTCCTCCTGCTATCCCTGCCCGTCCTAGCCGCCGGCATCACAATACT
ACTAACCGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCC
TGTACCAACACCTATTCTGATTCTTTGGCCAC 3'

23
5'AGTCAACCAGGCGCACTCCTTGGGCGACGATCAAATTTATAACGTGATCGTCACGGCACAC
GCCTTCGTAATAATCTTCTTTATAGTAATGCCACTAATAATTGGAGGCTTCGGAAACTGACTC
GTCCCCCTAATGATCGGAGCCCCCGACATGGCCTTCCCCCGAATAAACAACATGAGCTTCTG
ACTCCTCCCTCCATCGTTCCTGCTCCTCCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGA
CAGGCTGAACGGTCTACCCCCCTCTTGCAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACC
TCACCATTTTCTCCCTCCACCTAGCAGGCGTTTCATCAATTCTGGGAGCAATTAATTTTATTA
CTACCATCATCAACATAAAACCCCCTGCCATTTCACAATACCAAACACCCCTCTTTGTTTGAT
CCGTCCTTATTACAGCCGTACTCCTCCTGCTATCCCTGCCCGTCCTAGCCGCCGGCATCACAA
TACTACTAACCGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCA
ATCCTGTACCAACACCTATTCTGATTCTTTGGCCACc 3'

24
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCa 3'

25
5'CgGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCA 3'

26
5'AAGTCAACCCGGCGCACTCCTGGGCGACGATCAAATTTATAACGTAATCGTCACGGCACAC
GCCTTCGTAATAATTTTCTTTATAGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTC
GTTCCCCTAATGATCGGAGCCCCCGACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTG
ACTTCTTCCTCCGTCTTTCCTGCTCCTCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGAC
AGGTTGAACAGTATACCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACC
TCACTATTTTTTCACTTCACTTAGCAGGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTAC
TACTATTATTAATATGAAACCCCCTGCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATC
CGTCCTTATTACAGCTGTCCTCCTCCTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAAT
ACTACTAACTGACCGAAACCTCAACACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCA
TCCTATACCAGCATTTATTCTGATTCTTTGGCCACCA 3'

27
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCAgAAGTCTAA 3'

28
5'AAACCaTAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTAATACCAC
TAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGACATGGCC
TTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCTCCTAGCA
TCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTGCAAGTAA
TCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAGGCGTTTC
ATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTGCCATTTC
ACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCCTGCTGTC

CCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAACACCTCTT
TCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTCTTTGGC
CACC 3'

29
5'cGGAACAGCCCTAAGCCTGCTTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCG
ACATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCC
TCCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCA
GGCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCT
GCAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTC
CTACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATT
CTTTGGCCACc 3'

30
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTTGGCCACCCaGAAGTCTAA 3'

31
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTATCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATT
ATTTGGCCACCaGAAAGTCTAA 3'

32
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTTGGCCACCCaGAAAGTCTAA 3'

33
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA

CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTATCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCAgAAAGTCTAA 3'

34
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGGACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCAgAAAgTCTAA 3'

35
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTCCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACC 3'

36
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCaGAAAGTCTAA 3'

37
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACC 3'

38
5'GTCAACCAGGCGCACTCCTGGGCGACGATCAAATTTATAACGTAATCGTCACGGCACACGC
CTTCGTAATAATTTTCTTTATAGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGT
CCCCCTAATGATCGGAGCCCCCGACATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGC
TTCTCCCTCCATCTTTCCTGCTCCTCCTAGCATCTTCCGGAGTAGAAGCCGGGGCCGGCACAG
GTTGAACAGTTTACCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTC
ACTATTTTCTCACTTCACTTAGCAGGCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACT
ACTATTATTAATATAAAGCCCCCTGCAATCTCACAATACCAGACACCCCTCTTTGTTTGATCC
GTCCTTATTACAGCCGTCCTTCTCCTACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATA
CTGCTAACTGACCGAAACCTCAACACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCAT
CCTATACCAGCACTTATTCTGATTCTTTGGCCACCa 3'

39
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCAGAAAGTCTAA 3'

40
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTAGCCACCcagAAGTCTAA 3'

41
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCaGAAGTCTAA 3'

42
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG

CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCagAAGTCTAA 3'

43
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAACTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACC 3'

44
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACC 3'

45
5'CAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTAATACCACTAATA
ATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCGACATAGCCTTCCC
CCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCT
GGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTTGCAAGCAATCTTG
CCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCAGGTGTTTCATCAA
TTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCTGCAATCTCACAGT
ACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTACTGCTATCTCTGC
CCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAACACCTCTTTCTTTG
ACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATTCTTTGGCCAC 3'

46
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCA 3'

47
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATTGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT

CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCAc 3'

48
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTACCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCaGAAGTCTAAA 3'

49
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCaGAAGTCTAA 3'

50
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA
GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGATT
CTttGGCCACC 3'

51
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCAGAAGTCTAA 3'

52
5'CAACCAGGCGCGCTCCTGGACGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCT
TCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCC
CCCTAATGATTGGGGCCCCCGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTT
CTCCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGG
CTGAACAGTCTATCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCAC
CATCTTCTCACTCCACCTAGCAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTAC
TATTATCAACATAAAACCCCCTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGT
CCTTATTACAGCCGTCCTGCTACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCT
ATTAACTGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCC
TATACCAACACTTGTTCTGATTCTTTGGCCACCA 3'

53
5'CAACCAGGCGCGCTCCTGGGCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCT
TCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCC
CCCTAATGATTGGGGCCCCCGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTT
CTCCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGG
CTGAACAGTCTATCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCAC
CATCTTCTCACTCCACCTAGCAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTAC
TATTATCAACATAAAACCCCCTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGT
CCTTATTACAGCCGTCCTGCTACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCT
ATTAACTGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCC
TATACCAACACTTGtTCTGATACTTTGGCCAC 3'

54
5'GTCAACCAGGCGCGCTCCTGGGCGACGATCAAATTTATAACGTGATCGTCACGGCACACGC
CTTCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGT
CCCCCTAATGATCGGGGCCCCCGACATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGAC
TCCTTCCTCCATCGTTCCTGCTCCTCCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACA
GGTTGAACCGTCTATCCCCCTCTCGCAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTC
ACCATCTTCTCCCTCCACCTAGCAGGCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACT
ACCATCATCAACATAAAACCCCCTGCCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCT
GTCCTTATTACAGCCGTACTGCTCCTGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATA
CTACTAACAGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGAT
CCTGTACCAACACCTATTCTGATTCTTTGGCCAC 3'

55
5'CGGAACAGCCCTTAAGCCTGCTTCATCCGGGCAGAACTTTAGTCAACCAGGCGCGCTCCTG
GGCGACGATCAAATTTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTAT
AGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCC
CCGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGC
TCCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCT
CTTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTA
GCAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCC
CCTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTG
CTACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTC
AACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTG
ATTCTTTGGCCACCA 3'

56
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA

CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAGAAGTCTAAA 3'

57
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCAGAAGTCTAA 3'

58
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACC 3'

59
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACCA 3'

60
5'GTCAACCCGGCGCACTCCTGGGCGACGATCAAATTTATAACGTAATCGTCACGGCACACGC
CTTCGTAATAATTTTCTTTATAGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGT
TCCCCTAATGATCGGAGCCCCCGACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGAC
TTCTTCCTCCGTCTTTCCTGCTCCTCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAG
GTTGAACAGTATACCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTC
ACTATTTTTTCACTTCACTTAGCAGGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACT
ACTATTATTAATATGAAACCCCCTGCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCC
GTCCTTATTACAGCTGTCCTCCTCCTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATA
CTACTAACTGACCGAAACCTCAACACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCAT
CCTATACCAGCATTTATTCTGATTCTTTGGCCACCAg 3'

61
5'TAATTTTCTTTATGGTCATACCTTTAATAATCGGGGGCTTCGGAAATTGACTTGTCCCCCTG
ATAATCGGCGCCCCTGATATAGCCTTTCCCCGAATAAACAATATAAGTTTCTGGCTTCTTCCT
CCCTCATTTCTGCTTCTTCTAGCATCTTCTGGTGTAgAAGCTGGGGCGGGGACCGGATGAACT
GTTTACCCCCCTCTAGCAGGTAATCTCGCCCACGCAGGAGCATCCGTAgATTTAACAATTTTC
TCTCTTCATCTGGCCGGTATTTCTTCGATTCTTGGAGCAATCAACTTTATTACTACCATTATTA

ATATAAAACCTCCAGCCATCACTCAATATCAGACACCTTTGTTTGTCTGGGCCGTGTTAATTA
CAGCAGTTCTTCTTTTACTCTCTCTTCCTGTGCTGGCGGCTGGAATTACAATACTTTTAACAG
ATCGAAATCTTAACACCTCCTTTTTTGACCCAGCTGGTGGAGGAGACCCCATTTTGTACCAGC
ACCTTTTCTGATTCTTTGGCCACCCAgAAgTCTAA 3'

62
5'AGAAGGAACAGCGCGAAGCCTGCTCAACGAGCAGAACTAGTCAACCAGGCGCGCTCCTGG
GCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATA
GTAATACCACTAATAATCGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGGGCCCC
CGACATAGCCTTCCCCCGAATAAATAATATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCT
CCTCCTAGCATCTTCTGGAGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTC
TTGCAAGTAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATTTTCTCACTCCACCTAG
CAGGTGTCTCATCAATTCTAGGAGCAATCAATTTTATTACTACTATTATCAACATAAAACCCC
CTGCAATTTCACAGTACCAAACGCCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTTCTAC
TCCTGCTATCTCTACCCGTCTTGGCCGCCGGCATCACAATGCTACTAACTGACCGAAACCTCA
ACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGA
TTCTTTGGCCACCcA 3'

63
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCCAC 3'

64
5'TTCTTTATAGTAATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGAT
CGGAGCCCCCGACATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCAT
CGTTCCTGCTCCTCCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTC
TATCCCCCTCTTGCAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCC
CTCCACCTAGCAGGCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAAC
ATAAAACCCCCTGCCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACA
GCCGTACTCCTCCTGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGAC
CGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACA
CCTATTCTGATTCTTTGGCCACCCAGAAGTCTAA 3'

65
5'cGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTTGGCCACCaGAAGTCTa 3'

66
5'AACCAGGCGCGCTCCTGGGCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTT
CGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCC
CCTAATGATTGGGGCCCCCGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTC
TCCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCT

GAACAGTCTATCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCA
TCTTCTCACTCCACCTAGCAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTA
TTATCAACATAAAACCCCCTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCC
TTATTACAGCCGTCCTGCTACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTAT
TAACTGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTA
TACCAACACTTGTTCTGATTCTTTGGCCACCa 3'

67
5'TCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGCGACGATCAAATTTACAACGTGAT
CGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTT
TGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCGACATAGCCTTCCCCCGAATAAATA
ACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCTGGGGTAGAAG
CCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGC
GCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCAGGTGTTTCATCAATTCTAGGGGCA
ATTAATTTTATTACTACTATTATCAACATAAAACCCCCTGCAATCTCACAGTACCAAACACCC
CTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTACTGCTATCTCTGCCCGTCTTGGCCG
CCGGCATCACAATGCTATTAACTGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGA
GGGGGAGACCCAATCCTATACCAACACTTGTTCTGATTCTTTGGCCACC 3'

68
5'GTCAACCAGGCGCGCTCCTGGGCGACGATCAAATTTATAACGTGATCGTCACGGCACACGC
CTTCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGT
CCCCCTAATGATCGGGGCCCCCGACATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGAC
TCCTTCCTCCATCGTTCCTGCTCCTCCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACA
GGTTGAACCGTCTATCCCCCTCTCGCAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTC
ACCATCTTCTCCCTCCACCTAGCAGGCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACT
ACCATCATCAACATAAAACCCCCTGCCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCT
GTCCTTATTACAGCCGTACTGCTCCTGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATA
CTACTAACAGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGAT
CCTGTACCAACACCTATTCTGATTCTTTGGCCACC 3'

69
5'CAACCAGGCGCGCTCCTGGGCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCT
TCGTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCC
CCCTAATGATTGGGGCCCCCGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTT
CTCCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGG
CTGAACAGTCTATCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCAC
CATCTTCTCACTCCACCTAGCAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTAC
TATTATCAACATAAAACCCCCTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGT
CCTTATTACAGCCGTCCTGCTACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCT
ATTAACTGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCC
TATACCAACACTTGTTCTGATTCTTTGGCCaC 3'

70
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGAA
TCTTTGGCCACC 3'

71
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA

CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACC 3'

72
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA
GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATNNTGATT
NTTTGGCCACC 3'

73
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCAC 3'

74
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATN
ACTTTGGCCACCCaG 3'

75
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA
GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGATT
CTTTGGCCACC 3'

76
5'CGGAACAGCCCTAAGCCTGCTTCATTCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGG
GCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATA
GTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCC
CGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCT
CCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTC
TTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAG
CAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCC
CTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGC
TACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCA
ACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGA
TTCTTTGGCCACC 3'

77
5'cggaAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGCGAC
GATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTAATA
CCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCGACAT
AGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCCTCCT
AGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTTGCAA
GCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCAGGTG
TTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCTGCAA
TCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTACTGC
TATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAACACC
TCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATTCTTT
GGCCAC 3'

78
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACC 3'

79
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA
GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGATT
CTTTGGCCACC 3'

80
5'GTCAACCCGGCGCACTCCTGGGCGACGATCAAATTTATAACGTAATCGTCACGGCACACGC
CTTCGTAATAATTTTCTTTATAGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGT
TCCCCTAATGATCGGAGCCCCCGACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGAC
TTCTTCCTCCGTCTTTCCTGCTCCTCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAG
GTTGAACAGTATACCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTC
ACTATTTTTTCACTTCACTTAGCAGGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACT

ACTATTATTAATATGAAACCCCCTGCAATCTCACAGTATCAGACACCCCTCTTTGTTTGATCC
GTCCTTATTACAGCTGTCCTCCTCCTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATA
CTACTAACTGACCGAAACCTCAACACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCAT
CCTATACCAGCATTTATTCTGATTCTTTGGCCACCCAGAAAGTCTAA 3'

81
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCAGAAAGTCTAAA 3'

82
5'cGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACcCA 3'

83
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTATCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATANTGATT
CTTTGGCCACCAgAAGTCTAAA 3'

84
5'gTCAACCCGGCGCACTCCTGGGCGACGATCAAATTTATAACGTAATCGTCACGGCACACGC
CTTCGTAATAATTTTCTTTATAGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGT
TCCCCTAATGATCGGAGCCCCCGACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGAC
TTCTTCCTCCGTCTTTCCTGCTCCTCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAG
GTTGAACAGTATACCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTC
ACTATTTTTTCACTTCACTTAGCAGGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACT
ACTATTATTAATATGAAACCCCCTGCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCC
GTCCTTATTACAGCTGTCCTCCTCCTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATA
CTACTAACTGACCGAAACCTCAACACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCAT
CCTATACCAGCATTTAAAACtGATTCTTTGGCCACCA 3’

85
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG

ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCTAgCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCAC 3'

86
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCAcc 3'

87
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATNCTAATT
CTTTGGCCACA 3'

88
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTTGGCCACCC 3’

89
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCA 3'

90
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTANNTGAT
TCTTTGGCCACCca 3'

91
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCA 3'

92
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCA 3'

93
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACC 3'

94
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA

GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAgAAGTCTAA 3'

95
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCA 3'

96
5'ACGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGG
GCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATA
GTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCC
CGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCT
CCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTC
TTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAG
CAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCC
CTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGC
TACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCA
ACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGA
TTCTTTGGCCACCCAGAAAGTCTAA 3'

97
5'ggtgcttgagccggcatagtcggaacaGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCG
CACTCCTGGGCGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATT
TTCTTTATAGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATC
GGAGCCCCCGACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCT
TTCCTGCTCCTCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATA
CCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACT
TCACTTAGCAGGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATAT
GAAACCCCCTGCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGC
TGTCCTCCTCCTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCG
AAACCTCAACACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATT
TATTCTGATTCTTTGGCCACCCA 3'

98
5'GGTGCTTGAGCCGGCATAGTCGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTC
AACCAGGCGCGCTCCTGGGCGACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTC
GTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCC
CTAATGATCGGGGCCCCCGACATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCT
TCCTCCATCGTTCCTGCTCCTCCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTT
GAACCGTCTATCCCCCTCTCGCAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCA
TCTTCTCCCTCCACCTAGCAGGCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCA
TCATCAACATAAAACCCCCTGCCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCC
TTATTACAGCCGTACTGCTCCTGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTAC
TAACAGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTG
TACCAACACCTATTCTGATTCTTTGGCCACCCaGAAAGTCTA 3'

99
5'CGTGCTTGAGCCGGCATAGTCGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTC
AACCAGGCGCGCTCCTGGGCGACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTC
GTAATAATCTTCTTTATAGTAATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCC
CTAATGATTGGGGCCCCCGACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCT
CCCTCCGTCTTTCCTGCTCCTCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCT
GAACAGTCTATCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCA
TCTTCTCACTCCACCTAGCAGGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTA
TTATCAACATAAAACCCCCTGCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCC
TTATTACAGCCGTCCTGCTACTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTAT
TAACTGACCGAAACCTCAACACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTA
TACCAACACTTGTTCTGATTCTTTGGCCACCCAgAAGTC 3'

100
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATtCTGATTC
TTTGGCCACCCAGAAGTCTAA 3'

101
5'TAgTCGGAACaGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCT
GGGCGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTAT
AGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCC
CCGACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGC
TCCTCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCT
CTTGCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTA
GCAGGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCC
CCTGCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTC
CTCCTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTC
AACACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGA
TTCTTTGGCCACCCAgAAGTCTAA 3'

102
5'GGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACCCAGAAGTCTAA 3'

103
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA

GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGATT
CTTTGGCCACCCAgAAGTCTAA 3'

104
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTNATT
CTTTGGcCACcCAgAAGTCTAAA 3'

105
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAGAAGTCTAA 3'

106
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAGAAGTCTAA 3'

107
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCAGAAGTCTAA 3'

108

5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCGTCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTAGCCACCCAgAAGTCTAAA 3'

109
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCAA 3'

110
5'cGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAGAAGTCTAA 3'

111
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAgAAGTCTAA 3'

112
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC

TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACCCAGAAGTCTAA 3'

113
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAgAAGTCTAA 3'

114
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGgccACccAgAAGTCTAA 3'

115
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTTGgcCACCCAggAAGTCTAA 3'

116
5'cGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCTCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTNGCCACCCaGAAAGTCTAAA 3'

117
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA

CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTAGgCCACCAgAAGTCTAA 3'

118
5'cGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTNGCCACCcAGAAGTCTAA 3'

119
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCTCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCCT
GCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAACA
CCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTCT
TTGGCCACCa 3'

120
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACCcCAGAAGTCTA 3'

121
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTTGGCNACCcAgAAGTCTAA 3'

122
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAgAAGTCTAAA 3'

123
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA
GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGATT
CTTTGGCCACCcAgAAgTCTAAA 3'

124
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGcCACCcAgAAGTCTA 3'

125
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGgcCACCa 3'

126
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA

GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGATT
CTTTGGCCACcCa 3'

127
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATAGCCTTTCCCCGAATGAATAACATAAGCTTCTGGCTTCTCCCTCCATCTTTCCTGCTCCT
CCTAGCATCTTCCGGGGTAGAAGCCGGGGCCGGCACAGGTTGAACAGTTTACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCCCCAGCGTGGACCTCACTATTTTCTCACTTCACTTAGCAG
GCATTTCCTCAATTCTGGGAGCAATTAATTTCATTACTACTATTATTAATATAAAGCCCCCTG
CAATCTCACAATACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTCCTTCTCC
TACTCTCCCTGCCCGTCTTGGCCGCCGGCATCACAATACTGCTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGAGGGGGAGACCCCATCCTATACCAGCACTTATTCTGATTC
TTTGGCCACcca 3'

128
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAACATCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCcACCCAGAAGTCTA 3'

129
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAgAAGTCTAA 3'

130
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCCAgAAgTCTAA 3'

131

5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCCATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCAcCA 3'

132
5'AGTCAACCCGGCGCACTCCTGGGCGACGATCAAATTTATAACGTAATCGTCACGGCACACG
CCTTCGTAATAATTTTCTTTATAGTAATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCG
TTCCCCTAATGATCGGAGCCCCCGACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGA
CTTCTTCCTCCGTCTTTCCTGCTCCTCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACA
GGTTGAACAGTATACCCCCCTCTTGCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCT
CACTATTTTTTCACTTCACTTAGCAGGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACT
ACTATTATTAATATGAAACCCCCTGCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCC
GTCCTTATTACAGCTGTCCTCCTCCTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATA
CTACTAACTGACCGAAACCTCAACACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCAT
CCTATACCAGCATTTATTCTGATTCTTTGGCCACCAA 3'

133
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTggccACCA 3'

134
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCA 3'

135
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA

CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACccAgAAGTCTA 3'

136
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGgcCACCCAgAAGTCTAAATA 3'

137
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCA 3'

138
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCcA 3'

139
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTCTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTGTTCTGATTC
TTTGGCCACC 3'

140
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT

CCTAGCATCTTCCGGGGTGGAAGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCAG 3'

141
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGG
CGACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGT
AATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCG
ACATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCC
TCCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCA
GGCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCT
GCAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTC
CTACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAA
CACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGAAT
CTTTGACCACCA 3'

142
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACCA 3'

143
5'cGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTAAGTCAACCCGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTAATCGTCACGGCACACGCCTTCGTAATAATTTTCTTTATAGTA
ATACCGTTAATAATTGGAGGCTTTGGAAACTGACTCGTTCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAATAACATAAGCTTCTGACTTCTTCCTCCGTCTTTCCTGCTCCT
CCTAGCATCCTCCGGAGTAGAAGCCGGAGCCGGGACAGGTTGAACAGTATACCCCCCTCTTG
CAAGCAATCTTGCCCACGCTGGCGCCAGCGTGGACCTCACTATTTTTTCACTTCACTTAGCAG
GCGTTTCCTCAATTCTAGGAGCAATTAATTTCATTACTACTATTATTAATATGAAACCCCCTG
CAATCTCACAGTACCAGACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCTGTCCTCCTCC
TACTCTCCCTGCCCGTCTTAGCCGCCGGCATCACAATACTACTAACTGACCGAAACCTCAAC
ACCTCCTTCTTTGACCCCGCCGGTGGAGGGGACCCCATCCTATACCAGCATTTATTCTGATTC
TTTGGCCACCAA 3'

144
5'CGGAACAGCCCTAAGCCTGCTCATCCGGGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTACAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGT
AATACCACTAATAATTGGAGGCTTTGGAAACTGGCTCGTCCCCCTAATGATTGGGGCCCCCG
ACATAGCCTTCCCCCGAATAAATAACATAAGCTTCTGGCTTCTCCCTCCGTCTTTCCTGCTCC
TCCTAGCATCTTCTGGGGTAGAAGCCGGGGCCGGGACAGGCTGAACAGTCTATCCCCCTCTT
GCAAGCAATCTTGCCCACGCTGGCGCCTCCGTTGACCTCACCATCTTCTCACTCCACCTAGCA
GGTGTTTCATCAATTCTAGGGGCAATTAATTTTATTACTACTATTATCAACATAAAACCCCCT
GCAATCTCACAGTACCAAACACCCCTCTTTGTTTGGTCCGTCCTTATTACAGCCGTCCTGCTA
CTGCTATCTCTGCCCGTCTTGGCCGCCGGCATCACAATGCTATTAACTGACCGAAACCTCAA
CACCTCTTTCTTTGACCCCGCCGGAGGGGGAGACCCAATCCTATACCAACACTTGTTCTGATT
CTTTGGCCACACA 3'

145
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCCA 3'

146
5'CGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACcca 3'

147
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTGATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCA 3'

148
5'cGGAACAGCCCTAAGCCTGCTCATCCGAGCAGAACTTAGTCAACCAGGCGCGCTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTTGGAAACTGGCTTGTCCCCCTAATGATCGGGGCCCCCGA
CATAGCCTTCCCTCGAATAAATAACATGAGCTTCTGACTCCTTCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGAGTGGAAGCCGGGGCCGGAACAGGTTGAACCGTCTATCCCCCTCTCG
CAAGTAATCTCGCCCACGCTGGCGCTTCCGTTGACCTCACCATCTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATCAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAGTACCAAACACCCCTCTTTGTTTGATCTGTCCTTATTACAGCCGTACTGCTCC
TGCTATCCCTGCCTGTCCTAGCCGCCGGCATCACAATACTACTAACAGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCGATCCTGTACCAACACCTATTCTGATTC
TTTGGCCACCA 3'

149
5'GCCTCCTCATCCGAGCAGAACTTAGTCAACCTGGGGCCCTCCTGGGAGATGACCAAATTTA
CAATGTGATCGTTACGGCACACGCTTTCGTAATAATCTTTTTTATAGTTATACCTTTAATAAT
TGGAGGCTTTGGGAACTGATTAATCCCCCTAATGATTGGAGCCCCTGATATAGCCTTCCCCC
GAATGAACAACATAAGCTTCTGACTCTTGCCCCCATCTTTCCTTCTGCTCTTAGCATCATCAG
GGGTTGAAGCCGGAGCAGGCACAGGATGAACTGTTTACCCTCCCCTAGCCGGAAACCTCGC
ACATGCCGGAGCCTCCGTAGACCTGACTATCTTTTCTCTTCATTTAGCTGGTGTTTCATCTATT
CTAGGGGCAATTAATTTTATTACCACTATTATTAACATGAAACCCCCAGCTATTTCACAATAC

CAAACACCATTGTTTGTATGAGCTGTATTAATTACCGCTGTCCTTCTTCTTTTATCACTTCCAG
TTTTAGCAGCTGGTATTACAATGCTCTTAACTGACCGTAATCTTAACACTTCCTTCTTTGACC
CTGCTGGAGGAGGGGACCCTATCCTCTACCAACACTTATTCTGATTCTTTGGCCACCA 3'

150
5'CGGAACAGCCCTAAGCCTACTCATCCGAGCAGAACTTAGTCAACCAGGCGCACTCCTGGGC
GACGATCAAATTTATAACGTGATCGTCACGGCACACGCCTTCGTAATAATCTTCTTTATAGTA
ATACCACTAATAATTGGAGGCTTCGGAAACTGACTCGTCCCCCTAATGATCGGAGCCCCCGA
CATGGCCTTCCCCCGAATAAACAACATGAGCTTCTGACTCCTCCCTCCATCGTTCCTGCTCCT
CCTAGCATCTTCCGGGGTGGAGGCCGGGGCCGGGACAGGCTGAACGGTCTATCCCCCTCTTG
CAAGTAATCTTGCCCACGCTGGCGCTTCCGTTGACCTCACCATTTTCTCCCTCCACCTAGCAG
GCGTTTCATCAATTCTGGGAGCAATTAATTTTATTACTACCATCATCAACATAAAACCCCCTG
CCATTTCACAATACCAAACACCCCTCTTTGTTTGATCCGTCCTTATTACAGCCGTACTCCTCC
TGCTGTCCCTGCCCGTCCTAGCCGCCGGCATCACAATACTACTAACCGACCGAAACCTCAAC
ACCTCTTTCTTTGACCCCGCCGGAGGAGGAGACCCAATCCTGTACCAACACCTATTCTGATTC
TTTGGCCAC 3'

ANNEX III

Name in the label and authenticated species of the commercial hake samples analyzed. In red are marked the mislabelled samples.

Code 1	Code 2	Scientific name (buying time)	Scientific name from DNA	Fresh / Frozen
1	F1	M. merluccius	*Merluccius merluccius*	Fresh
2	F2	M. merluccius	*Merluccius merluccius*	Fresh
3	F3	M. merluccius	*Merluccius merluccius*	Fresh
4	F4	M. merluccius	*Merluccius merluccius*	Fresh
5	C1	M. australis	*Merluccius australis*	Frozen (bulk)
6	C2	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen (bulk)
7	F5		*Merluccius australis*	Fresh
8	F6	M. merluccius	*Merluccius merluccius*	Fresh
9	C3	**M. capensis / M. paradoxus**	*Pangasianodon hypophthalmus*	Frozen (bulk)
10	F7	M. merluccius	*Merluccius merluccius*	Fresh
11	F8	M. merluccius	*Merluccius merluccius*	Fresh
12	F9	M. merluccius	*Merluccius merluccius*	Fresh
13	F10	M. merluccius	*Merluccius merluccius*	Fresh
14	C4	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen (bulk)
15	F11	M. merluccius	*Merluccius merluccius*	Fresh
16	F12	M. merluccius	*Merluccius merluccius*	Fresh
17	F13	M. merluccius	*Merluccius merluccius*	Fresh
18	F14	M. merluccius	*Merluccius merluccius*	Fresh
19	F15	M. merluccius	*Merluccius merluccius*	Fresh
20	C5	**M. merluccius**	*Merluccius paradoxus*	Frozen (bulk)
21	C6	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen (bulk)
22	F16	M. merluccius	*Merluccius merluccius*	Fresh
23	F17	M. merluccius	*Merluccius merluccius*	Fresh
24	F18	M. merluccius	*Merluccius merluccius*	Fresh
25	C7	**M. australis**	*Merluccius paradoxus*	Frozen (bulk)
26	C8	**M. australis**	*Merluccius hubbsi*	Frozen (bulk)
27	F19	M. merluccius	*Merluccius merluccius*	Fresh
28	F20	M. merluccius	*Merluccius merluccius*	Fresh
29	F21	M. australis	*Merluccius australis*	Fresh
30	F22	M. merluccius	*Merluccius merluccius*	Fresh
31	F23	M. merluccius	*Merluccius merluccius*	Fresh
32	F24	M. merluccius	*Merluccius merluccius*	Fresh
33	F25	M. merluccius	*Merluccius merluccius*	Fresh
34	C9	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen (bulk)
35	C10	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen (bulk)
36	C11	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen (bulk)
37	C12	M. australis	*Merluccius australis*	Frozen (bulk)
38	C13	M. australis	*Merluccius australis*	Frozen (bulk)
39	C14	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen (bulk)
40	F26	M. capensis / M. paradoxus	*Merluccius capensis*	Fresh
41	F27	M. Spp (M. capensis / M. paradoxus)	*Merluccius capensis*	Fresh

42	F28	M. Spp (M. capensis / M. paradoxus)	*Merluccius capensis*	Fresh
43	C15	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
44	C16	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
45	C17	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
46	C18	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
47	C19	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
48	C20	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
49	C21	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen (bulk)
50	C22	M. hubbsi	*Merluccius hubbsi*	Frozen
51	C23	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
52	C24	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
53	C25	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
54	C26	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
55	C27	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
56	C28	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
57	C29	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
58	C30	M. capensis	*Merluccius paradoxus*	Frozen
59	C31	M. australis	*Merluccius australis*	Frozen
60	C32	M. hubbsi	*Merluccius hubbsi*	Frozen (bulk)
61	C33	**M. merluccius**	*Coryphaenoides acrolepis*	Frozen (bulk)
62	C34	**M. senegalensis**	*Merluccius polli*	Frozen (bulk)
63	F29	**M. capensis**	*Merluccius merluccius*	Fresh
64	F30	M. merluccius	*Merluccius merluccius*	Fresh
65	F31	**M. capensis / M. paradoxus**	*Merluccius merluccius*	Fresh
66	C35	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
67	C36	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
68	C37	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
69	C38	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
70	C39	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
71	C40	M. australis	*Merluccius australis*	Frozen
72	C41	M. hubbsi	*Merluccius hubbsi*	Frozen (bulk)
73	C42	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen (bulk)
74	C43	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen (bulk)
75	C44	M. Spp (M. hubbsi)	*Merluccius hubbsi*	Frozen
76	C45	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
77	C46	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
78	C47	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
79	C48	M. hubbsi	*Merluccius hubbsi*	Frozen
80	C49	M. hubbsi	*Merluccius hubbsi*	Frozen
81	C50	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
82	F32	M. australis	*Merluccius australis*	Fresh
83	F33	**M. australis**	*Merluccius merluccius*	Fresh
84	C51	M. hubbsi	*Merluccius hubbsi*	Frozen
85	C52	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
86	C53	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
87	F34	**M. merluccius**	*Merluccius australis*	Fresh
88	F35	M. merluccius	*Merluccius merluccius*	Fresh
89	C54	M. capensis	*Merluccius paradoxus*	Frozen

90	F36	M. merluccius	*Merluccius merluccius*	Fresh
91	C55	M. capensis	*Merluccius capensis*	Frozen
92	C56	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
93	C57		*Merluccius paradoxus*	Frozen
94	C58	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
95	C59	M. capensis	*Merluccius paradoxus*	Frozen
96	C60	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
97	C61	M. hubbsi	*Merluccius hubbsi*	Frozen
98	C62	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen (bulk)
99	C63	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen (bulk)
100	C64	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
101	C65	M. hubbsi	*Merluccius hubbsi*	Frozen
102	C66	M. australis	*Merluccius australis*	Frozen
103	C67	M. hubbsi	*Merluccius hubbsi*	Frozen
104	C68	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
105	C69	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
106	C70	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
107	C71	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
108	C72	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
109	C73	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
110	C74	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
111	C75	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
112	C76	M. australis	*Merluccius australis*	Frozen
113	C77	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
114	F37	M. merluccius	*Merluccius merluccius*	Fresh
115	F38	M. merluccius	*Merluccius merluccius*	Fresh
116	F39	M. merluccius	*Merluccius merluccius*	Fresh
117	F40	**M. hubbsi**	*Merluccius merluccius*	Fresh
118	F41	M. merluccius	*Merluccius merluccius*	Fresh
119	F42	**M. australis**	*Merluccius merluccius*	Fresh
120	F43	M. australis	*Merluccius australis*	Fresh
121	F44	M. merluccius	*Merluccius merluccius*	Fresh
122	C78	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
123	C79	M. hubbsi	*Merluccius hubbsi*	Frozen
124	C80	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
125	C81	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
126	C82	M. hubbsi	*Merluccius hubbsi*	Frozen
127	F45	M. australis	*Merluccius australis*	Fresh
128	F46	M. merluccius	*Merluccius merluccius*	Fresh
129	C83	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
130	C84	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
131	C85	M. capensis	*Merluccius capensis*	Frozen
132	C86	M. hubbsi	*Merluccius hubbsi*	Frozen
133	C87	M. capensis	*Merluccius paradoxus*	Frozen
134	C88	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
135	C89	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
136	C90	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
137	C91	M. capensis	*Merluccius capensis*	Frozen (bulk)

138	F47	M. merluccius	*Merluccius merluccius*	Fresh
139	F48	M. merluccius	*Merluccius merluccius*	Fresh
140	F49	M. merluccius	*Merluccius merluccius*	Fresh
141	C92	M. hubbsi	*Merluccius hubbsi*	Frozen
142	C93	M. capensis / M. paradoxus	*Merluccius paradoxus*	Frozen
143	C94	M. Spp	*Merluccius hubbsi*	Frozen
144	C95	M. Spp	*Merluccius paradoxus*	Frozen
145	C96	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
146	C97	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
147	C98	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
148	C99	M. capensis / M. paradoxus	*Merluccius capensis*	Frozen
149	C100	**M. hubbsi**	*Macruronus magellanicus*	Frozen
150	F50	M. merluccius	*Merluccius merluccius*	Fresh